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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/717,826

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Hao-Song Kong

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EXAMINER

WERNER, DAVID N

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/717,826	Applicant(s) KONG ET AL.	
	Examiner David N. Werner	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 7 is/are rejected.
- 7) ☒ Claim(s) 4-6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action in response to communications filed 08 August 2007, in reply to the Office action of 09 April 2007. Currently, claims 1-7 are pending. Of those, claim 7 is new. In the previous Office action, claims 1-3 were rejected under 35 U.S.C. 103(a) as obvious over "Temporal & Spatial Error Concealment Techniques for Hierarchical MPEG-2 Video Codec" (Aign et al.) in view of US Patent Application Publication 2003/0103681 A1 (Guleryuz), and claims 4-6 were rejected under 35 U.S.C. 103(a) as obvious over Aign et al. and Guleryuz, in view of "Multi-Directional Interpolation for Spatial Error Concealment" (Kwok et al.) In addition, the declaration of 20 November 2003, the specification, and claim 1 were objected to on formalities.

Oath/Declaration

2. The supplemental declaration of 08 March 2004 is acceptable. The previous objection to the declaration has been withdrawn.

Response to Amendment

3. Applicant's amendments to the specification and claim 1 have been fully considered. All objections based on formalities are withdrawn.

Response to Arguments

4. Applicant's arguments filed 08 August 2007 regarding claims 1-3 have been fully considered but they are not persuasive. Applicant argues, first, that the prior art does not teach the limitation in claim 1 of "concealing pixels...from nearest candidate pixels selected **from previously concealed pixels in the lost macroblock**" (emphasis added), second, that the limitation of claim 3 of recovering pixels "in a spiral order" does not follow from Guleryuz, and third, that the cited prior art does not teach the limitations of claim 4. The Examiner respectfully disagrees with these assertions.

5. In response to Applicant's argument that the prior art does not teach recovering candidate pixels from other pixels in a lost block, but instead recovers pixels based on pixels from surrounding blocks, while it is true that Aign does not teach this limitation, and while it is true that Guleryuz discloses setting **initial values** to pixels in a lost block based on a mean value of pixels surrounding the lost block, or alternatively, from a fixed constant (paragraph 0032), these initial values are NOT the final values determined for the lost pixels. Instead, a further series of processing is performed for each layer to recover the lost data (paragraph 0008). This processing is performed iteratively (paragraph 0009), from outer layers to inner layers, and "each layer is recovered from the preceding layers surrounding it" (paragraph 0018). These "preceding layers" correspond with the claimed "previously concealed pixels in the lost macroblock". Therefore, the Examiner respectfully maintains the rejection of claim 1 based on Guleryuz.

6. In response to Applicant's argument that the claimed spiral order of pixel recovery is incompatible with Guleryuz, applicant argues that "Guleryuz requires processing of all pixels in a previous layer to recover the current layer", and suggests equation 5 of Guleryuz in support. However, equation 5 of Guleryuz is part of a discussion of a further denoising operation, which is not necessarily a component of the main block recovery algorithm (paragraph 0038). In contrast, paragraph 0034 of Guleryuz discusses generating "partially de-noised" results for each layer, as shown in figures 4A-4D. The paper "Iterated Denoising for Image Recovery", which is an NPL version of the Guleryuz application, contains a higher-quality version of figure 4, showing a current layer with some coefficients that are hard-thresholded and some coefficients that are not hard-thresholded. Therefore, the examiner respectfully maintains that a spiral order of pixel recovery is implicitly encompassed in Guleryuz.

7. Applicant's arguments, see pages 11-13, filed 08 August 2007, with respect to claims 4-6 have been fully considered and are persuasive. The rejection of claims 4-6 under 35 U.S.C. 103 has been withdrawn.

Claim Objections

8. Claim 4 is objected to because of the following informalities: in line 13, the word "assign" should be "assigning". Appropriate correction is required.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claim 7 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 10 of copending Application No. 10/717,679. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims are directed to inter-frame video encoding in which macroblocks along edges of each inter-frame are replicated and appended at the end of the inter-frames.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

11. The text of the sections of Title 35, U.S.C. 103 not included in this action can be found in a prior Office action.

12. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Temporal & Spatial Error Concealment Techniques for Hierarchical MPEG-2 Video Codec" (Aign et al.), in view of US Patent Application 2003/0103681 (Guleryuz). Regarding claim 1, Aign et al. teaches a method for error concealment of a macroblock using spatial interpolation. Figure 2 shows an individual pixel in an error macroblock calculated from interpolation of boundary pixels in the four neighboring macroblocks. Equation 2 shows the interpolation technique, weighting values of boundary pixels according to the distance to the current pixel (§ 4.2). Regarding claim 2, figure 2 shows interpolation source pixels to be directly above, right of, below, and left of the current pixel. However, in the current invention, only pixels directly on the outer boundary of the error macroblock are calculated from previously calculated outer pixels, while in Aign et al., every pixel in the error macroblock is calculated from pixels in neighboring macroblocks.

Guleryuz discloses a method for recovering missing blocks in an image or a video frame using spatial information from surrounding blocks in layers. Figure 2 shows an image with a missing block, divided into layers. Regarding claim 1, in the method of Guleryuz, each layer is iteratively recovered using information from previous layers [0018]. Aign et al. discloses the claimed invention except for concealing pixels in a macroblock using previously concealed pixels. Guleryuz teaches that it was known to

recover inner pixels in a missing region of an image from recovered outer pixels. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to conceal pixels in an inner layer of a missing region according to pixels from an outer layer of a missing region, as taught by Guleryuz, since Guleryuz states in paragraphs [0065]-[0070] that such a modification would provide an error concealment method with additional robustness and versatility with improved accuracy.

Regarding claim 3, Guleryuz does not disclose the exact order or recovering pixels in each layer, but suggests recovering each layer in parts [0034]. However, if the pixels in each layer were recovered in an order starting from the upper left corner, and working along each edge of the missing region in turn, using the transforms of Guleryuz, the spiral claimed in the present invention would result. Therefore, it would have been an obvious matter of design choice to recover pixels in a spiral order, since the Applicant has not disclosed that the spiral order solves any stated problem or is for any particular purpose, and it appears that the invention would perform equally well with recovering pixels in each layer in a different order, such as beginning a spiral in a different corner.

Allowable Subject Matter

13. Claims 4-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and if rewritten or amended to overcome the objection on formalities set forth in this Office action.

14. The following is a statement of reasons for the indication of allowable subject matter: Claims 4-6 contain allowable subject matter since claim 4 is directed to a method of concealing errors in an intra-frame of video in which an evaluation score for a candidate pixel in a missing macroblock is determined as the sum of the difference between the intensity value of the candidate pixel and the median candidate pixel intensity value, and the distance between the candidate pixel and current pixel. US Patent 6,134,352 A (Radha et al.), does not disclose this feature.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 6,134,352 A (Radha et al.) teaches a method of concealing missing pixels in which an outer ring of recovered pixels is used to determine an inner ring, similar to Guleryuz. US Patent 6,512,795 B1 (Zhang), teaches an inter-frame pixel concealment method. US Patent 6,870,964 B1 (Cooper) teaches a system for filling in pixels in which pixels from eight directions are compared.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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DNW

